

**FORMING CARBON NANOTUBES AT LOWER TEMPERATURES SUITABLE  
FOR ELECTRON-EMITTING DEVICE, AND ASSOCIATED  
FABRICATION METHOD**

5    ABSTRACT

          An electron-emitting device contains a vertical  
emitter electrode patterned into multiple laterally  
separated sections situated between the electron-  
emissive elements, on one hand, and a substrate, on the  
10 other hand. The electron-emissive elements comprising  
carbon nanotubes are grown at a temperature range of  
300°C to 500°C compatible with the thermal stress of  
the underlying substrate. The electron-emissive  
elements are grown on a granulized catalyst layer that  
15 provides a large surface area for growing the electron-  
emissive elements at such low temperature ranges. To  
ensure growth uniformity of the carbon nanotubes, the  
granularized substrate is soaked in a pre-growth plasma  
gas to enhance the surface diffusion properties of the  
20 granularized substrate for carbon diffusion.